

No. 23-1311

IN THE
**UNITED STATES COURT OF APPEALS
FOR THE DISTRICT OF COLUMBIA CIRCUIT**

Public.Resource.Org, Inc., *et al.*,
Petitioners,

v.

Federal Communications Commission, *et al.*,
Respondents.

ON PETITION TO REVIEW AN ORDER
OF THE FEDERAL COMMUNICATIONS COMMISSION

**ADDENDUM TO AMICUS BRIEF OF ACCESSIBILITY
RESEARCH AND ADVOCACY ORGANIZATIONS**

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April 3, 2024

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STATUTES AND REGULATIONS

1. THE REHABILITATION ACT OF 1973

1.1. SECTION 504 (29 U.S.C. § 794)—NON-DISCRIMINATION UNDER FEDERAL GRANTS AND PROGRAMS

(a) Promulgation of rules and regulations—No otherwise qualified individual with a disability in the United States, as defined in section 705(20) of this title, shall, solely by reason of her or his disability, be excluded from the participation in, be denied the benefits of, or be subjected to discrimination under any program or activity receiving Federal financial assistance or under any program or activity conducted by any Executive agency or by the United States Postal Service.

1.2. SECTION 508 (29 U.S.C. § 794D)—ELECTRONIC AND INFORMATION TECHNOLOGY

(a) Requirements for Federal departments and agencies

(1) Accessibility

(A) Development, procurement, maintenance, or use of electronic and information technology—When developing, procuring, maintaining, or using electronic and information technology, each Federal department or agency, including the United States Postal Service, shall ensure, unless an undue burden would be imposed on the department or agency, that the electronic and information technology allows, regardless of the type of medium of the technology—

[...]

(ii) individuals with disabilities who are members of the public seeking information or services from a Federal department or agency to have access to and use of information and data that is comparable to the access to and use of the information and data by such members of the public who are not individuals with disabilities.

(B) *Alternative means efforts*—When development, procurement, maintenance, or use of electronic and information technology that meets the standards published by the Access Board under paragraph (2) would impose an undue burden, the Federal department or agency shall provide individuals with disabilities covered by paragraph (1) with the information and data involved by an alternative means of access that allows the individual to use the information and data.

(2) *Electronic and information technology standards*

(A) *In general*—Not later than 18 months after August 7, 1998, the Architectural and Transportation Barriers Compliance Board (referred to in this section as the “Access Board”), after consultation with the Secretary of Education, the Administrator of General Services, the Secretary of Commerce, the Chairman of the Federal Communications Commission, the Secretary of Defense, and the head of any other Federal department or agency that the Access Board determines to be appropriate, including consultation on relevant research findings, and after consultation with the electronic and information technology industry and appropriate public or nonprofit agencies or organizations, including organizations representing individuals with disabilities, shall issue and publish standards setting forth—

(i) for purposes of this section, a definition of electronic and information technology that is consistent with the definition of information technology specified in section 11101(6) of title 40; and

(ii) the technical and functional performance criteria necessary to implement the requirements set forth in paragraph (1).

2. THE AMERICANS WITH DISABILITIES ACT OF 1990

2.1. SECTION 302 (42 U.S.C. § 12182) – PROHIBITION OF DISCRIMINATION BY PUBLIC ACCOMMODATIONS

(b) Construction

(1) General Prohibition

(A) Activities

(i) It shall be discriminatory to subject an individual or class of individuals on the basis of a disability or disabilities of such individual or class, directly, or through contractual, licensing, or other arrangements, to a denial of the opportunity of the individual or class to participate in or benefit from the goods, services, facilities, privileges, advantages, or accommodations of an entity.

3. 41 U.S.C. § 11011 – DEFINITIONS

(6) Information technology.—The term “information technology”—

(A) with respect to an executive agency means any equipment or interconnected system or subsystem of equipment, used in the automatic acquisition, storage, analysis, evaluation, manipulation, management, movement, control, display, switching, interchange, transmission, or reception of data or information by the executive agency, if the equipment is used by the executive agency directly or is used by a contractor under a contract with the executive agency that requires the use—

(i) of that equipment; or

(ii) of that equipment to a significant extent in the performance of a service or the furnishing of a product;

(B) includes computers, ancillary equipment (including imaging peripherals, input, output, and storage devices necessary for security and surveillance), peripheral equipment designed to be controlled by the central processing unit of a computer, software, firmware and similar procedures, services (including support services), and related resources; but

(C) does not include any equipment acquired by a federal contractor incidental to a federal contract.



Accessibility Review of Standard Developing Organizations Reading Rooms and Associated Portals and Documents

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March 26, 2024

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Introduction

This document enumerates some accessibility concerns exhibited by eleven reading rooms reached using the main ANSI portal found at <https://ibr.ansi.org/>, many of which will represent potential blockers for one or more user groups, such as:

- Blind site visitors who must explore content using a screen reader;
- People with different levels of dexterity or range of motion who might be using a keyboard or a switch device or might interact with the content through voice commands processed by speech-input software;
- Users with reading, cognitive or learning differences;
- People with vestibular conditions who may be sensitive to increased movement on a page;
- Visitors with low vision who require text to be presented with sufficient color contrast or might need to rely on display customization settings and larger font sizes; and
- People with color blindness who cannot distinguish information revealed using color.

Each observation includes:

- the description of the non-compliant behavior;
- links to one or more failed WCAG success criteria; and
- the impact on various user groups.

Please see [Appendix: Failed Success Criteria](#) for a listing of all WCAG 2.1 level A/AA requirements that are not met and have been deemed as most impactful.

The report does not represent a formal accessibility audit or exhaustive review. We may refer to components or page sections used within the product by name throughout. Please also note that the environment under evaluation may have undergone additional changes since the evaluation results in this report were recorded; the date on this document reflects its completion and delivery, and not the date(s) during which the assessment was carried out.

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Executive Summary

Severe accessibility problems persist in the provided Reading Rooms, associated portals, and documents for various standards. While some improvements have been made on a few sites, in most cases these problems have been occurring for several years now with no signs of progress, continuing to block user access to their content. This is noted for both free and paid materials.

- Navigation through the ANSI portal is still challenging for blind users and once a standard is reached, the actual content of the document is still inaccessible. Site visitors with low vision, color blindness, or various levels of dexterity also encounter problematic content. Similarly, the ANSI Webstore site continues to exhibit critical accessibility blockers.
- No changes whatsoever have been made to the registration process for the API Reading Room which, among many accessibility problems, has a CAPTCHA text that cannot be passed using a screen reader. The website for the API Publications Store has been redesigned and no longer has an overlay applied. The new theme colors resolved the older color contrast problems; however, severe inaccessible implementations have been carried onto the new site, making the task of completing a purchase impossible for several user groups.
- Exploring the ASTM Reading Room is still done with difficulty using the keyboard and screen reader users still cannot access the document content in the provided viewer.
- The ASHRAE reading room, bookstore, or PDF documents show no accessibility improvements, preventing many user groups from accessing products. Additionally, the bookstore uses a third-party overlay with the intent to correct the many accessibility issues, but most problems persist, and new hurdles are introduced affecting all users.
- The AHRI Reading Room has been redesigned with some inclusive considerations which partly address previous problems or introduce new ones. Standards are still provided in PDFs which are either inaccessible or do not communicate their visual structure and are difficult to explore.
- No improvements have been made for the AISC Reading Room. In order to access the free version of the standard one must submit a non-fillable inaccessible form presented in a PDF format.

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- The SIBR Database continues to block screen reader users from accessing the main menu by incorrectly hiding it. Some improvements have been made, e.g. to help keyboard users bypass repeated blocks of content, while most problems are untouched.
- No improvements whatsoever have been made to the APA – The Engineered Wood Association website to provide access to the standards for disabled users.
- The IEEE Reading Room still contains links to standards which are inaccessible for keyboard-only users. It also requires users to create an account and sign in, but all related forms exhibit severe issues. Blind users encounter significant content hidden from screen readers preventing them from successfully signing in. At the end of the process, the standards are still offered in an inaccessible viewer.
- The Underwriters Laboratories website has a registration form now but replicates previous accessibility problems which especially impact blind and low-vision users. If users manage to register on the site, documents may be reached with difficulty either in an inaccessible PDF format, or as an HTML file but with problematic navigation.
- The ICC Digital codes website offers several ways to find content in their database, but most of them have severe accessibility problems, including components being hidden from screen readers, presence of controls which are not keyboard operable, or have no accessible name or are reached in an incorrect focus order. Documents have a "Table of Contents" navigation component with inaccessible links for keyboard-only users and all that is available is expanding or collapsing the nodes in the navigational structure, but users cannot access anything further than the introductory page.

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User Journey

ANSI Portal

URL: <https://ibr.ansi.org/>

Steps:

1. Go to the ANSI portal at <https://ibr.ansi.org/>.
2. Find links that lead to various reading rooms.
3. Select a reading room in the "Hosted by ANSI" section.
4. Complete the Registration form.
5. Open the "View Only" PDF for any documentation using Adobe Acrobat and the FileOpen Acrobat plug-in.
6. Purchase a document on the [ANSI Webstore](#) site.

Incomplete Semantic Mark-Up

The pages are visually structured into distinct sections that serve a specific purpose, such as the page header, site navigation, main content, and footer. These regions are not marked up in a programmatic way, so that the same information can be conveyed to blind screen reader users. Additionally, while some visual headings are provided, the heading structure is either incomplete or inaccurate due to some incorrect heading levels.

Fails

[1.3.1 Info and Relationships \(level A\)](#)

User Impact

Without sight, screen reader users cannot determine how content is structured on a page. Additionally, without the appropriate semantic mark-up for headings and regions, users cannot effectively skip to a specific section. Instead, they must explore the page in a linear manner and try to determine the relations between elements,

REV-6

which are visually obvious. This increases the cognitive load for using the site and the time spend to reach the intended documentation.

Lack of Focus Indicator on Navigation Links

When users press Tab or Shift+Tab through the page there is no visual cue to indicate when the main navigation links are focused. The default focus outline is removed from the "About the IBR Portal", "Hosted by ANSI", "Hosted by SDOs", "FAQ", and "Contact" links using the CSS "outline-style: none". There is no custom focus indicator provided to replace the browser's default outline.

Fails

[2.4.7 Focus Visible \(level AA\)](#)

User Impact

Folks with different levels of dexterity that interact with the site using a keyboard cannot determine when the links are focused so they can access those pages on the website. When users cannot see the focus indicator, they will unintendedly interact with the wrong element resulting in a time consuming and frustrating experience.

Use of Color to Convey Presence of Links

The presence of links within paragraphs is conveyed using blue text (#E74B3A; #1E6A9D), but the default underline decoration is removed via "text-decoration: none" styling. There is no alternative provided to help users identify links when they cannot perceive the color change, including on keyboard focus and mouse hover.

Fails

[1.4.1 Use of Color \(level A\)](#)

REV-7

User Impact

For site visitors with low vision or color blindness, the links look very similar or the same as the surrounding text in a paragraph, meaning that such users may not be able to determine that text with the mentioned styling is actionable. This leads to an inequitable experience, as users that miss those links have to look for alternate ways to find intended content.

Problematic Accessible Names for "Registration" Form Fields

The "Registration" form is implemented using a layout table structure with the form labels displayed in the second column, and the form fields on the fourth column. All input fields or single-select elements use the aria-label attribute to indicate their purpose, instead of a programmatic association with their visible label. In some cases, the aria-label value does not include the entire text of the visible label.

Fails

- [1.3.1 Info and Relationships \(level A\)](#)
- [2.5.3 Label in Name \(level A\)](#)

User Impact

Speech-input users cannot use the visible label in a voice command to interact with the "Zip code" and "Telephone" fields. The fact that the fields are inside a table leads to increased verbosity in the screen reader output which makes it harder to determine a field's purpose and current value. With the current implementation, the fields have smaller target areas which do not include the visible labels, requiring additional effort on behalf of users with tremors or other dexterity challenges or from users with low vision who rely on screen magnification.

Missing Programmatic Indication of Input Purpose

The input fields in the "Registration" form do not have an autocomplete attribute to indicate their purpose.

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Fails

[1.3.5 Identify Input Purpose \(level AA\)](#)

User Impact

Users with cognitive challenges or motor disabilities may have difficulties remembering personal data or filling it in each time they encounter similar forms. Other users also suffer from the lack of autocomplete semantics, e.g. screen reader users operating touch-based devices where typing in text is almost always slower than with a physical keyboard.

Inaccessible Error Handling

When the "Registration" form is submitted with invalid data, error messages are listed above the form, however they are not surfaced in an accessible manner so that screen reader users become aware of their presence or updated content when the form is resubmitted. Additionally:

- Required fields in the form are visually marked with a red asterisk but the same is not conveyed to blind screen reader users.
- No inline error messages exist and fields in error are visually identified using a right-pointing arrow icon with no text alternative.
- Error messages are not programmatically associated with the corresponding fields to assist users in correcting the entry.

Fails

- [1.3.1 Info and Relationships \(level A\)](#)
- [3.3.1 Error Identification \(level A\)](#)
- [3.3.2 Labels or Instructions \(level A\)](#)
- [4.1.3 Status Messages \(level AA\)](#)

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User Impact

Users without sight, which must rely on a screen reader to fill out the form, will find it difficult to correct any errors in the "Registration" form. Users can only guess which fields are required and which are optional. If errors occur when the form is submitted, e.g. insufficient information is provided, users encounter complete silence in the screen reader output. When they return to the fields, no indication is given if a field is in error or not, and users must manually locate the error summary on the page, then try to find the correct field and remember how to fix the error.

Problematic Instructions for Opening PDF

In order to access the read-only copy of the standards, users must download the FileOpen plug-in and the Adobe PDF Reader. There are no clear instructions on how to open the file once downloaded and all that is mentioned is:

- On the FAQ page: "Click 'Download file'" button which will bring up a read-only PDF copy of the standard."; or
- On the "Download PDF Standards page": "Due to the requirements of some standards publishers, some standards or codes purchased through the ANSI Web Store are encrypted and "locked" to the device upon which they are first opened using Digital Rights Management (DRM). This prevents the copying of the document to another device. These DRM-protected documents will only open if both Adobe Acrobat and the free FileOpen Acrobat plug-in are installed on your device.". This text is displayed using light gray text with very low color contrast.

In the Chrome browser, when the user selects the downloaded file, it opens the PDF Viewer with the message "Error Failed to load PDF document.". At this point, the user has installed all required software, downloaded the file, and cannot read it. This is a severe impediment since nowhere in the instructions is it stated clearly that users must open the file from the download location using Adobe PDF Reader.

Fails

[3.3.2 Labels or Instructions \(level A\)](#)

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User Impact

Users who are not familiar with the default device settings will think that the PDFs are broken and cannot be accessed. This issue will be encountered by many users due to the popularity of the Chrome browser that has its own [PDF viewer](#).

Problematic PDF Documents

There are several accessibility issues that relate to the "view-only" PDFs:

- Content is not tagged to ensure that appropriate semantic mark-up is used, and that the reading order is meaningful.
- Scanned documents contain mostly images of text making the PDF completely inaccessible with a screen reader.
- The document language or title are not set.
- Mathematical equations do not make sense when reached with a screen reader.
- Text alternatives are not provided for images, diagrams, charts, or graphs.
- Tables and lists are not marked up correctly.
- Incorrect nesting is flagged for many elements.
- Visual headings are not implemented as semantic headings.

Fails

- [1.1.1 Non-text Content \(level A\)](#)
- [1.3.1 Info and Relationships \(level A\)](#)
- [1.3.2 Meaningful Sequence \(level A\)](#)
- [2.4.1 Bypass Blocks \(level A\)](#)
- [2.4.2 Page Titled \(level A\)](#)
- [3.1.1 Language of Page \(level A\)](#)
- [4.1.1 Parsing \(level A\)](#)

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User Impact

When a document is reviewed using a screen reader, it can be difficult or impossible to understand the information in the PDFs:

- In scanned documents, e.g. "ANSI+S1.4-1983+(R2006)+ANSI+S1.4a-1985+(R2006)" (American National Standard Specification for Sound Level Meters), screen readers encounter each page as an image with no text alternative. Additionally, the text is also difficult to read by screen magnification users.
- Mathematical formulas are sometimes the primary content of a standard, as noted in the case of the "ANSI S3.22-2003 (Errata) Erratum to ANSI S3.22-2003 American National Standard Specification of Hearing Aid Characteristics". They cannot be accessed at all by a blind screen reader user, who will hear random meaningless digits and/or some symbols.
- Images such as diagrams are completely inaccessible for someone who cannot rely on sight.
- Information in data tables is in many cases not communicated in the context of their visual column headers, meaning that such data will be difficult or impossible to process.
- The lack of heading mark-up is especially problematic when it comes to finding content in such large documents containing hundreds of pages.
- The reading order is sometimes incorrect when content is positioned on two columns. Instead of hearing the content of the column to the right-side first, followed by the one on the left-side, unrelated parts of text from both adjacent blocks are interposed in the reading order. The resulting screen reader output is difficult or impossible to comprehend.

Inaccessible ANSI Webstore

Those who wish to purchase a document on the [ANSI Webstore](#) site, or must resort to this flow due to impediments encountered with the ANSI portal, are faced with additional accessibility problems:

- There is no visual indicator for the keyboard focus for most of the controls, meaning that users cannot determine the focused element.

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- The "Products" control in the main navigation expands a list of related links, however the control does not perform any action when activated with the keyboard by pressing Enter or Space.
- When a user is logged in, the "Hello, <User's First Name>" disclosure control in the main navigation, cannot be reached at all by keyboard users, meaning that the "Profile", "Order History", and "Log out" links are completely inaccessible.
- Many checkboxes and radio buttons are hidden with "display: none" and custom ones are present. Such controls cannot be reached using the keyboard when pressing Tab or Shift+Tab, such as:
 - the "Accept End User License Agreement" checkbox, which is required in order to complete the checkout flow. This fully blocks keyboard-only users from completing the order;
 - "Keep me signed in" checkbox on the Sign in page; and
 - the payment options radio buttons on the Cart page, "Pay by Credit card" and "Pay by Deposit account". Since "Pay by Credit card" is selected by default keyboard-only users must proceed with this form of payment.
- Input fields in the "Sign In" and "Reset Password" forms are missing a visible and programmatic label. They rely on placeholder text that:
 - is inconsistently supported across browsers;
 - is no longer present once a value is entered, meaning that once the form is filled out it cannot be reviewed since all fields have no labels; and
 - is displayed with a very low color contrast ratio and is hard to read by many users—especially people with low vision.
- The native radio buttons in the "Create new account" form are assigned the same ID value (id="AccountType") affecting the programmatic association of the radio buttons with their visible labels meaning that it cannot be conveyed correctly for screen reader users. Other input fields in the form have inaccurate accessible names as well due to incorrect ID values.
- Input fields in the "Billing Address" form have visible labels but are not associated with the fields. They also rely on the placeholder value for an accessible name. Here the placeholder text can be additionally problematic, especially in the case of the "City" text field where its value is "New York" which is confusing for everyone:
 - sighted users might think that they must be located in New York to proceed; while

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- screen reader users will hear the field announced as "New York, edit, blank" when empty and if a city is typed in, such as Atlanta, the announcement is "New York, edit, selected Atlanta" (NVDA with Chrome).
- In many forms errors are not surfaced to screen reader users when displayed. Additionally, some errors are associated with the corresponding fields, others are not.
- Other controls are implemented using non-semantic `` or `<div>` elements that cannot be reached at all using a keyboard, with or without a screen reader. This is the case for example for:
 - the delete buttons in the cart; and
 - the password visibility toggle button.
- Insufficient color contrast has been identified for many text elements, and this will impact users with low vision, cognitive differences, or reading disabilities. Some examples of problematic color combinations are:
 - red text on white background;
 - dark gray button text on green background; and
 - gray text on white background.
- Both input field borders and their placeholder text are displayed with very low color contrast making them hard to see for users with low vision.
- Several controls have uninformative names. For example, the button which opens the "Cookie Settings" overlay has an uninformative name of "Open /Close widget". Additionally, no programmatic mark-up exists to convey the overlay as a dialog or to manage keyboard focus when users interact with the component.
- The "We're here to help" button has no accessible name and is only announced with its role of "button" using a screen reader with no indication of its purpose.
- The cookies banner cannot be dismissed using the keyboard and must be encountered on each page since the custom "Accept All Cookies" button does not respond to keyboard activation with Enter or Space. There is also no "Skip to main content" present and users must tab through the cookie prompt and the repeated header controls on each page in the checkout flow in order to reach the main content.
- The semantic mark-up of headings and landmarks is not an actual representation of the visual structure with many problems including the following:

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- the <main> element incorrectly wraps the header, main navigation, and search feature, while on some pages the main content is not encompassed in a landmark; and
- many heading levels are incorrect, e.g. on the "Cart" page, visual headings are not implemented as such, or empty headings exist e.g. "OSHA CFR 29" page.

Fails

- [1.1.1 Non-text Content \(level A\)](#)
- [1.3.1 Info and Relationships \(level A\)](#)
- [2.1.1 Keyboard \(level A\)](#)
- [2.4.1 Bypass Blocks \(level A\)](#)
- [2.4.3 Focus Order \(level A\)](#)
- [2.4.6 Headings and Labels \(level AA\)](#)
- [4.1.1 Parsing \(level A\)](#)
- [4.1.2 Name, Role, Value \(level A\)](#)

User Impact

The ANSI Webstore shows high severity issues that impact users of access technology. The most severely affected are:

- keyboard-only users who cannot go past the "Billing address" step where it is impossible to check the "Accept End User License Agreement" checkbox;
- screen reader users who cannot efficiently navigate through the page or determine the purpose of several actionable elements; and
- sighted users with cognitive differences who will have trouble determining the purpose of each field where a persistent visible label is not provided.

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American Petroleum Institute

URL: <https://publications.api.org/>

Steps:

1. Go to the ANSI portal at <https://ibr.ansi.org/>.
2. Go to the "Hosted by SDOs" section.
3. Activate the "American Petroleum Institute" logo link to open <https://publications.api.org/>.
4. Create an account.
5. Log in.
6. Open any read-only document and access its content.
7. Purchase a document on the [API Publications Store](#) site.

Inaccessible CAPTCHA Test

The "Create an Account" form contains a required CAPTCHA test, that is based on the users' ability to perceive a set of letters in an image of text. This test constitutes a significant blocker for someone that cannot rely on sight, for several reasons:

- There is no alternative for the visual test that would be based on a different perception modality.
- The test image is missing an alt attribute to convey the purpose of the image, meaning that some screen readers will ignore the image completely while others will announce the source file name, which is not relevant either.
- The input field is missing an accessible name to convey its purpose and what information needs to be entered in this field.

Fails

- [1.1.1 Non-text Content \(level A\)](#)
- [4.1.2 Name, Role, Value \(level A\)](#)

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User Impact

It is impossible for a blind screen reader user to figure out the letters in the image and pass the test. Such users cannot create an account with API since the CAPTCHA test is required to submit the form. Without an account, a blind user cannot access any of the API standards.

Missing Visible and/or Programmatic Labels for Input Fields

The fields in the "Create an Account" form do not have persistent visible labels. Placeholder text is used in all input fields which is problematic for several reasons:

- it is displayed with insufficient color contrast;
- it disappears once a value is entered; and
- it is inconsistently supported by screen readers.

In the case of the "Country" single-select, there is no visible or programmatic label, and the field relies only on its default value, which is "Select".

In the "Log in" form, the "Email" field lacks an association with its visible label meaning that the placeholder text, "jane.doe@example.com", is the only indication of the input purpose for blind screen reader users. The format sample, as "jane.doe@example.com" makes sense only when heard within the context of an email field.

Fails

- [1.3.1 Info and Relationships \(level A\)](#)
- [3.3.2 Labels or Instructions \(level A\)](#)
- [4.1.2 Name, Role, Value \(level A\)](#)

User Impact

When form fields do not have persistent labels:

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- Sighted users cannot review the form, since once a value is entered in each field, they all look the same and users cannot determine if the correct information was typed into the correct field unless they delete the entry to see the placeholder.
- Site visitors with low vision may not be able to read the placeholder text at all to determine what needs to be typed into each field.
- Blind screen reader users may hear the fields announced without any indication of the fields' purpose. Note that most screen readers use a "Forms" mode when a field is reached so that data is typed in, and text that is interposed between form elements will be missed if not associated with the corresponding field.

Finally, when the purpose of a field is unclear, the chances to submit the form with incorrect information are higher, meaning increased time and effort is needed for such simple tasks.

Missing Programmatic Indication of State for "Read-Online Documents" Control

In the main navigation bar of the "API | Training" page the "Read-Online Documents" control is followed by a downwards-pointing chevron icon to visually indicate that this is a disclosure control used to expand and collapse a menu with links to various documents. The same information is not available in an accessible manner to indicate the control's functionality and its current state.

Fails

[4.1.2 Name, Role, Value \(level A\)](#)

User Impact

Blind screen reader users are unable to tell the function from the control's name alone. Since it is announced as a link, users would expect to reach a new page upon activation. This is not the case since "Read-Online Documents" acts as a disclosure button. When activated, there is no speech output to indicate what happened, and users cannot tell if the control is working or not, or whether additional content is revealed or hidden.

REV-18

Inaccessible PDF Viewer for Read-Only Documents

The "HTML5 e-Publication" reading room poses critical and high severity level accessibility issues that affect many user groups.

- Most interactive elements including the page navigation controls cannot be reached when pressing Tab or Shift+Tab. Keyboard-only users may be able to see the controls but cannot interact with them or their associated content.
- The "Buy Now" link lacks a focus indicator and has an uninformative accessible name of "Welcome.." when reached with a screen reader. This also means that speech input users cannot activate it by using its visible text in a voice command.
- The page titles are ambiguous, for example "1595_e2_Reaffirm2019-PubAcc".
- The standards documentation pages are images with no textual alternative which means that screen reader users are fully blocked from accessing the read-only version.
- Many actionable elements are announced without a descriptive name or actionable role, e.g. the "Index" controls. This will make most of the functionality inaccessible to screen reader users, as they will not be able to determine control purpose without an appropriate accessible name being provided.
- No accessible feedback mechanism is provided for screen reader users whenever content is dynamically updated or when a loading animation is visually displayed.
- Elements are encountered in a reading order that is not meaningful when hidden content is reached.

Fails

- [1.1.1 Non-text Content \(level A\)](#)
- [2.1.1 Keyboard \(level A\)](#)
- [2.4.3 Focus Order \(level A\)](#)
- [1.4.5 Images of Text \(level AA\)](#)
- [4.1.2 Name, Role, Value \(level A\)](#)
- [4.1.3 Status Messages \(level AA\)](#)

REV-19

User Impact

- The "read-only" documents are inaccessible for all users with different levels of dexterity that cannot interact with the viewer using a mouse, since actionable elements cannot be reached with a keyboard.
- For blind screen reader users, the viewer is completely unusable since controls either lack an accessible name and role to indicate their purpose or they simply cannot be activated. Additionally, the content in the document pages is not available for blind people since they are images of text without any text alternative.
- Since the "Buy Now!" link exhibits several accessibility problems, many users of access technology may be prevented from purchasing the documentation as well.

Problematic API Publications Store

Those who wish to purchase a document on the [API Publications Webstore](#) site must resort to this flow due to impediments encountered with the PDF Viewer, are faced with additional accessibility problems:

- Many controls lack a focus indicator on all pages, while others have a pulsating highlight styling for the focus state which affects the readability of the control's state and can be bothersome for users with vestibular conditions.
- Many links, e.g. "View Details" throughout the site are incorrectly nested inside buttons or themselves have child elements as buttons, and the controls are not keyboard operable. They also have non-unique uninformative accessible names.
- The "Twitter Feed" component on the homepage autorotates endlessly with no mechanism in place to pause or stop it. Additionally, the component cannot be by-passed using the keyboard and contains a large number of cards.
- Many controls which use an icon as a visible label, e.g. the social media links, have no accessible names.
- In many forms within the checkout flow, input fields, radio buttons, and checkboxes are unlabeled and errors are not surfaced in an accessible manner.
- Keyboard focus is trapped on the "Your Cart" page in between the controls related for the item in cart. Keyboard users cannot proceed with the checkout.
- Once users are signed in, if they expand the account menu button `aria-hidden="true"` is applied on a page container (`<div>` with `id="root"`) making the page unusable for users of access technologies.

REV-20

- The controls which update the cart are either not keyboard focusable, e.g. the "Remove" links, or cause focus to be lost, as noted for the quantity buttons. At the same time, the accompanying text field does not allow users to edit its value.
- Visual headings are not semantically marked up to allow screen reader users to understand the page structure and find content. At the same time, most existing headings are marked up at an incorrect level.
- When full-page or text-only zoom is applied some elements become overlapped resulting in loss of content, e.g. the "Addenda/Errata" cards on the standard detail page.
- While most content meets the color contrast requirements, some elements still have insufficient color contrast such as some icons for tooltip buttons, field borders, and placeholder text.
- Many pages are not responsive and at 320px browser width, some content becomes obscured, or users must scroll in both dimensions to access information.

Note that an additional site for the API Publications Store is hosted using the Techstreet platform and uses a third-party overlay. Refer to: [Problematic ASHRAE Bookstore Site](#). This site no longer seems to be linked from the API Reading Room.

Fails

- [1.1.1 Non-text Content \(level A\)](#)
- [1.3.1 Info and Relationships \(level A\)](#)
- [1.4.3 Contrast \(Minimum\) \(level AA\)](#)
- [1.4.4 Resize text \(level AA\)](#)
- [1.4.10 Reflow \(level AA\)](#)
- [2.1.1 Keyboard \(level A\)](#)
- [2.1.2 No Keyboard Trap \(level A\)](#)
- [2.2.2 Pause, Stop, Hide \(level A\)](#)
- [2.4.3 Focus Order \(level A\)](#)
- [2.4.4 Link Purpose \(In Context\) \(level A\)](#)
- [2.4.7 Focus Visible \(level AA\)](#)
- [4.1.1 Parsing \(level A\)](#)

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- [4.1.2 Name, Role, Value \(level A\)](#)
- [4.1.3 Status Messages \(level AA\)](#)

User Impact

- The missing focus indicator, the incorrect focus management, the inoperability of some controls, and the instance of focus trap are severe impediments for sighted keyboard users who expect the focus indicator to follow the visual order of elements on the screen. Such users will experience frustration and significant increase in effort to go through the checkout steps and are blocked from accessing some of the site's features.
- Blind users will be prevented from successfully completing a purchase if they encounter the severe issue which hides the entire page content from screen readers. Additionally, submitting the many forms encountered during checkout is problematic because some form controls announce without a label and the presence of error messages is not communicated.
- The automatic rotation of the "Twitter Feed" component is problematic for many user groups including:
 - neurodiverse users with cognitive differences, since the movement can affect their ability to focus and process information presented on the page;
 - users with vestibular conditions, for whom the animation may trigger symptoms such as dizziness, nausea, and/or headaches;
 - keyboard users who cannot by-pass the component and feel as if the keyboard focus is trapped due to the large number of interactive elements;
 - screen magnification users who may become confused when their diminished viewport lands on frequently changing content; and
 - screen reader users who aren't given sufficient time to read the content of a feed before the active one changes.

REV-22

ASTM Reading Room

URL: <https://www.astm.org/products-services/reading-room.html>

Steps:

1. Go to the ASTM home page at <https://www.astm.org/>.
2. Go to the "Sign in" menu button.
3. Create an account.
4. Log in.
5. Expand "Products & Services" in the navigation bar.
6. Select "Reading Room".
7. Select "Open Reading Room".
8. Review "ASTM License Agreement" and proceed with "Agree and Continue".
9. Open any read-only document and access its content.

Lack of Focus Indicator in Reading Room on Document Links

When users press Tab or Shift+Tab through the links in the "ASTM Standards Referenced in Code of Federal Regulations" or the "COVID-19 Related Standards" accordion panels there is no visual cue to indicate which link is focused. The default focus outline is removed using the styling of "outline: 0" without the provision of a custom focus indicator.

Fails

[2.4.7 Focus Visible \(level AA\)](#)

User Impact

Users with different levels of dexterity that interact with the site using a keyboard cannot determine the focused document link and they will unintendedly interact with the wrong element. This is especially impactful in the case of the "ASTM Standards Referenced in Code of Federal Regulations" links which are grouped in a list with 1462 items and visually tracking the links with each Tab press is close to impossible.

REV-23

Problematic Modal Dialogs

- Whenever a modal interface appears, such as the "Sign in to access Reading Room" or the "ASTM License Agreement" dialogs, the keyboard focus is not managed correctly and is no longer visible.
- The ASTM License Agreement cannot be scrolled using a keyboard which is problematic for folks that have different levels of dexterity and cannot use a mouse.
- Visual headings in the ASTM License Agreement are not semantically marked up or have an incorrect heading level making it difficult for screen reader users to understand the overlay structure and find content.

Fails

- [1.3.1 Info and Relationships \(level A\)](#)
- [2.1.1 Keyboard \(level A\)](#)
- [2.4.3 Focus Order \(level A\)](#)

User Impact

Keyboard-only users have no option to scroll the ASTM License Agreement and must either proceed without reading it or abandon the process. If such users agree with the terms, they become legally obligated to respect terms that they are unable to reach.

Incorrect Semantic Mark-Up

The reading room pages are visually structured into distinct sections that serve a specific purpose. Some regions are not marked up in a programmatic way, such as the footer, so that the same information can be conveyed to blind screen reader users. In other cases, a group of side navigation links are incorrectly marked up as a "tablist" without required parent-child roles. Additionally, while some visual headings are provided, the heading structure is inaccurate due to incorrect heading levels as observed for the "COVID-19 Related Standards" accordion buttons.

REV-24

Fails

- [1.3.1 Info and Relationships \(level A\)](#)
- [4.1.2 Name, Role, Value \(level A\)](#)

User Impact

Without sight, screen reader users cannot determine how content is structured on a page. Additionally, without the appropriate semantic mark-up for headings and regions, users cannot effectively skip to a specific section. Instead, they must explore the page in a linear manner and try to determine the relations between elements, which are visually obvious. This increases the cognitive load for using the site and the time spent to reach the intended documentation.

Inaccessible Content Viewer

The ASTM standards open in an iframe with title="webviewer" which comes with critical blockers for many user groups.

- The document content is implemented using a <canvas> with no textual alternative.
- Most controls have accessible names, but some are reached in an incorrect focus order, or keyboard focus is lost after interaction.
- Some documents contain links, which allow keyboard-only users to scroll the content in the viewer, however some standards do not contain any focusable elements and cannot be scrolled at all without the ability to operate a mouse.
- Since links are implemented as non-semantic elements with class="link" and tabindex="0", they are missing a programmatic name and role to indicate their purpose. Note that external links seem to be non-functional at the moment.
- When pressing Tab or Shift+Tab, hidden controls receive focus meaning that the focus indicator is no longer visible.
- Links inside the document are only identified using a different color, as noted for "Standard Test Method for Failure in Sewn Seams of Woven Fabrics".

REV-25

Fails

- [1.1.1 Non-text Content \(level A\)](#)
- [1.3.2 Meaningful Sequence \(level A\)](#)
- [2.1.1 Keyboard \(level A\)](#)
- [2.4.3 Focus Order \(level A\)](#)
- [4.1.2 Name, Role, Value \(level A\)](#)

User Impact

Blind screen reader users cannot access any of the document content. None of the text that is seen in the viewer is spoken by the screen reader. Links are not communicated with their visible text to indicate their purpose and instead, users hear meaningless announcements, e.g. "blank" when a link is reached. This format of presenting the standards is completely unusable for someone that cannot rely on sight.

Sighted users with different levels of dexterity that cannot operate a mouse and rely on a keyboard cannot scroll through the document if links are not present, e.g. "A226/A226M-95 Specification for Electric-Resistance-Welded Carbon Steel Boiler Superheater Tubes for High-Pressure Service (Withdrawn 1997)". Instead, users must zoom out to fit the entire page content into the browser viewport, which will render the text either difficult to read or simply unreadable. When interacting with the toolbar controls users will track the focused element with difficulty due to the problematic focus order.

Color-blind users will not distinguish between link and static text in paragraphs and will miss such features.

REV-26

ASHRAE (Heating and Air Conditioning Association)

URL: <https://www.ashrae.org/technical-resources/standards-and-guidelines/read-only-versions-of-ashrae-standards>

Steps:

1. Go to the ANSI portal at <https://ibr.ansi.org/>.
2. Go to the "Hosted by SDOs" section.
3. Activate the "ASHRAE" logo link to go to the [Preview ASHRAE Standards and Guidelines](#) page.
4. Open any read-only document and access its content.
5. Purchase a document on the [ASHRAE Bookstore](#) site.

Note that not all document links open the document in the iWrapper powered viewer. In some cases, such as the "Standard 185.2-2020 -- Method of Testing Ultraviolet Lamps for Use in HVAC&R Units or Air Ducts to Inactivate Microorganisms on Irradiated Surfaces" the user is taken directly to the product detail page in the ASHRAE Bookstore.

Insufficient Color Contrast for Many Links

On the "Preview ASHRAE Standards and Guidelines" page, many links are displayed with a low color contrast against their background. This is especially challenging when it comes to the standard documentation links which use a light blue color (#00AED8), resulting in a 2.6:1 color contrast ratio against the white background color (#FFFFFF), below the minimum requirement of 4.5:1.

Additionally, when such links appear in a paragraph there is no other visual cue, such as an underline, to help users distinguish them from the surrounding static text.

Fails

- [1.4.1 Use of Color \(level A\)](#)
- [1.4.3 Contrast \(Minimum\) \(level AA\)](#)

REV-27

User Impact

Site visitors with low vision or color blindness may not be able to see the link text due to the very light font color. This is especially problematic since all document links, which make up for most content of the page, are styled the same way.

Problematic Keyboard Navigation

The links in the main navigation have an icon to visually indicate that a submenu with related links is available. These links appear on mouse-hover over the corresponding link. An accessible alternative is not available for users with different levels of dexterity that interact with the fly-out menu using a keyboard or voice commands.

- There is no control provided to reveal the submenu and keyboard-only users cannot focus the icon. When the link is reached, it can be activated to open the corresponding page, not to reveal or hide the submenu.
- When pressing Tab or Shift+Tab through the main navigation section, all 192 submenu links are focused although they are not visible.
- There is no "Skip to main content" link in the <header> to allow keyboard-only users to skip the header with the navigation bar and reach the main content.

Fails

- [2.1.1 Keyboard \(level A\)](#)
- [2.4.3 Focus Order \(level A\)](#)

User Impact

Sighted keyboard-only users cannot access the submenus in the main navigation. Since the links are invisible when focused, users cannot determine which element is reached or if the focus is trapped somewhere. Additionally, the required effort to go through all links in the navigation bar is significant and considering that there are 192 Tab stops on hidden links, users will become frustrated and might abandon the page altogether.

REV-28

Inaccessible "Share This" Controls

The links in the "Share This" section have an icon to visually indicate their functionality, but they cannot be reached using a keyboard.

Fails

- [2.1.1 Keyboard \(level A\)](#)
- [4.1.2 Name, Role, Value \(level A\)](#)

User Impact

Sighted keyboard-only users cannot access the links and share a resource.

Incorrect Heading Structure

While some visual headings are provided, the heading structure is either incomplete or inaccurate due to some incorrect heading levels.

Fails

[1.3.1 Info and Relationships \(level A\)](#)

User Impact

Without sight, screen reader users cannot determine how content is structured on a page. Additionally, without the appropriate semantic mark-up for headings and regions, users cannot effectively skip to a specific section. Instead, they must explore the page in a linear manner and try to determine the relations between elements, which are visually obvious. This increases the cognitive load for using the site and the time spent to reach the intended documentation.

Inaccessible Content Viewer

The ASHRAE standards open using a document viewer powered by iWrapper, which is completely inaccessible for many user groups.

REV-29

- When pressing Tab to the first interactive element on the page, the "ASHRAE" logo link, the keyboard focus is trapped and does not move forward to any elements on the page. In fact, all focusable elements trap forward focus and the user must press Shift+Tab to move backwards to the browser controls and return to some of the viewer elements. If at any point the Tab key is pressed, focus becomes trapped.
- There are only six controls included in the focus order, while the remaining ones cannot be reached at all with the keyboard. There is no focus indicator on these buttons or links and users cannot determine the focused element.
- The document container is not keyboard focusable and cannot be scrolled to view its content. The document cannot be printed either.
- Since the page input shows the default caret or value highlight on focus, the user may attempt to type in a different page number, but only the top of the page is visible since the viewer content cannot be scrolled. The combobox with zoom level options and preset display preferences is set by default to "Fit Width" and it cannot be expanded using a keyboard. If the user is able to guess that it accepts percentage values, e.g. "60%", and types in a value, the document page becomes fully visible in the viewer, but text is so small that it cannot be read. The zoom buttons cannot be reached with the keyboard. This means that even if other pages can be loaded, their content cannot be read.
- Using a screen reader, the viewer controls are all unlabeled and announce only as "link" or "edit" (for the page and zoom level input fields) or with no role at all as "clickable" or "blank". There is also no text alternative for the content of each page.

Fails

- [1.1.1 Non-text Content \(level A\)](#)
- [2.1.1 Keyboard \(level A\)](#)
- [2.1.2 No Keyboard Trap \(level A\)](#)
- [2.4.3 Focus Order \(level A\)](#)
- [4.1.2 Name, Role, Value \(level A\)](#)

REV-30

User Impact

The document content is completely inaccessible for anyone who cannot see or cannot use a mouse.

- Sighted keyboard-only users can find workarounds to read the top of any page, but everything else cannot be reached.
- Blind screen reader users cannot access any of the document content.
- Speech input users cannot scroll the document either and will find it extremely difficult to interact with the viewer controls.

Problematic Errata PDF Documents

There are several accessibility issues that relate to the "view-only" Standards Errata PDFs:

- Documents are not tagged to ensure that appropriate semantic mark-up is used and that content is accessed in a meaningful reading order.
- The document language or title are not set.
- Mathematical equations do not make sense when reached with a screen reader.
- Tables and lists are not marked up correctly.
- Incorrect nesting is flagged for many elements.
- Visual headings are not implemented as semantic headings, while text in paragraphs is conveyed incorrectly as a heading.
- Significant areas are styled differently to convey that they have been added as new content or changed, but background color changes, text underline, or strikethrough are not conveyed to screen reader users. Additionally, text that is crossed out is read as part of the paragraph, altering its intended meaning. Instructions that explain the meaning of such styling rely on the user's ability to see these format updates:
 - "The shaded items have been added since the previous errata sheet"; and
 - "Additions are shown in underline and deletions in strikethrough."

REV-31

Fails

- [1.3.1 Info and Relationships \(level A\)](#)
- [1.3.2 Meaningful Sequence \(level A\)](#)
- [1.3.3 Sensory Characteristics \(level A\)](#)
- [2.4.2 Page Titled \(level A\)](#)
- [3.1.1 Language of Page \(level A\)](#)
- [4.1.1 Parsing \(level A\)](#)

User Impact

When a document is reviewed using a screen reader, it can be difficult or impossible to understand the information in the PDFs, such as what content is added or changed or mathematical formulas.

The incorrect heading mark-up is very confusing, since blind screen reader users rely on headings to get an overview of what is in the document and find a specific area of interest.

Problematic ASHRAE Bookstore Site

The site uses an AccessiBe overlay that gets toggled when exploring the site with access technology.

- The "Accessibility Adjustments" dialog is problematic in itself for several reasons, such as:
 - The search input is unusable for blind users because typing in letters will trigger screen reader shortcuts and suddenly move focus outside the input.
 - Switch components use a focus indicator which relies solely on the change in font color.
 - Modal dialogs lack an accessible name and when dismissed, focus is lost.
 - Language buttons are not grouped in a list and lack a programmatic indication of the foreign language.
 - Visual headings are missing semantic mark-up.

REV-32

- Many controls have non-unique and uninformative accessible names.
- There is no programmatic feedback for screen reader users when changes are made.
- Using some of the AccessiBe adjustments seem to impact the site's usability in a negative way, for example, when users press the Tab key to access the elements on the page, the "Keyboard Navigation (Motor)" switch is toggled on automatically. This causes the logo, the search feature, and the main navigation controls to become invisible on the page. When keyboard users reach these elements they cannot see their labels or the focus indicator.
- For further reading on the user impact of such tools please refer to the [Overlay Fact Sheet](#).

The site shows severe accessibility problems:

- Whenever a modal interface appears, the keyboard focus is not managed correctly, for example:
 - The content of the dialog with the title of "This Item Is Already In Your Cart" can only be reached after pressing Tab through all elements of the page.
 - When adding an item to cart the focus is trapped between the controls in the "Upgrade this item" section and users cannot dismiss the dialog to return to the product page.
- The keyboard focus often becomes lost after performing an action such as closing a dialog.
- The "Payment Method" pill-shaped options are implemented as list items without an interactive role. They cannot be focused with a keyboard unless the AccessiBe "Keyboard Navigation (Motor)" switch is toggled On.
- In a similar way, without the overlay, many controls lack a focus indicator on all pages, making it impossible for sighted keyboard-only users to track the focused element.
- Visual headings are not semantically marked up to allow screen reader users to understand the page structure and find content.
- When reaching the standards page in the bookstore, a data table is used to visually indicate available formats with details and an "Add to cart" button. This visual representation is not programmatic, meaning that screen reader users will not hear the information in the table in a meaningful order and with the column

REV-33

header context. It is also difficult to determine which format is added to cart since all buttons have the same accessible names as "Add to cart".

- Tooltips with additional information, such as "What's a Multi-User PDF?" cannot be accessed using a keyboard.
- Additional form controls are either missing a visible and accessible name, such as the "Coupon Code" field, or are not associated correctly with their visible labels, such as the "Shipping Method" radio buttons.
- The "Add new address" button in the checkout flow is not keyboard operable.
- "Successful submission!" is announced whenever a form is submitted, regardless of the actual outcome, while errors that appear in the form are not surfaced in an accessible way for screen reader users. This problem might be related to the AccessiBe overlay. Additionally, inline errors are not associated with the corresponding fields.
- The checkout steps rely on color identification to indicate incomplete steps which is problematic for site visitors with color blindness, low vision, or blind screen reader users.
- Information listed in a data table, e.g. the "Shipping" section, is not programmatically implemented using table semantics, meaning data will be communicated without context for screen reader users and will be hard to understand.
- Insufficient color contrast has been identified for many text elements, and this will impact users with low vision, cognitive, or reading differences. Some examples are:
 - white header link text on light green;
 - light green text on white background;
 - white button text on orange background;
 - orange text on white background;
 - grey text on grey background;
 - white text on blue background; and
 - blue text on white or grey background.

Fails

- [1.1.1 Non-text Content \(level A\)](#)

REV-34

- [1.3.1 Info and Relationships \(level A\)](#)
- [1.4.1 Use of Color \(level A\)](#)
- [1.4.3 Contrast \(Minimum\) \(level AA\)](#)
- [2.1.1 Keyboard \(level A\)](#)
- [2.1.2 No Keyboard Trap \(level A\)](#)
- [2.4.3 Focus Order \(level A\)](#)
- [2.4.6 Headings and Labels \(level AA\)](#)
- [3.1.2 Language of Parts \(level AA\)](#)
- [4.1.1 Parsing \(level A\)](#)
- [4.1.2 Name, Role, Value \(level A\)](#)
- [4.1.3 Status Messages \(level AA\)](#)

User Impact

Some features can only be accessed with a keyboard when using the AccessiBe mode for keyboard navigation. This places individuals using access technologies at a significant disadvantage in navigating the site, in view of the following:

- Sighted users that cannot operate a mouse and interact with the pages using a keyboard cannot complete the checkout flow and purchase the standards.
- Some workarounds for the keyboard blockers exist when using a screen reader, however for users who are blind it is very difficult to understand their current context in any given step of the checkout.

REV-35

AHRI Reading Room

URL: <https://www.ahrinet.org/standards/-hid-ahri-standards/hvacr-industry-standards/ahri-ari-standards-referenced-in-us>

Steps:

1. Go to the ANSI portal at <https://ibr.ansi.org/>.
2. Go to the "Hosted by SDOs" section.
3. Activate the "AHRI" logo link to go to the [AHRI \(ARI\) Standards Referenced in US Regulations](#) page.
4. Open any read-only document and access its content.

Problematic Focus Indicator

Many controls use a thin dotted orange (#FFB24C) outline which has an insufficient color contrast of 1.8:1 with the page's white (#FFF) background color, below the 3:1 contrast requirement for focus indicators.

Additionally, some elements lack any visual indication of their focus state, e.g. the category buttons in the "Filter by" component.

Fails

- [1.4.11 Non-text Contrast \(level AA\)](#)
- [2.4.7 Focus Visible \(level AA\)](#)

User Impact

Sighted keyboard-only users can navigate through the actionable elements on the page but cannot determine which element is focused so that they know when to interact with a specific control.

REV-36

Problematic Site Navigation Controls

Several elements in the header have a submenu with related links and mouse users can click on a control to show or hide the submenu. Their implementation causes a problematic keyboard interaction:

- If activated by pressing Enter, they act as links to the respective category page if one exists. If not, users are taken to the [404 page](#), as noted for the "News & Events" control.
- If activated using Space, the submenu becomes expanded or collapsed.
- When Escape is pressed while exploring a submenu, the keyboard focus returns to the parent disclosure control, but the submenu remains visible.

Fails

- [2.1.1 Keyboard \(level A\)](#)
- [2.4.3 Focus Order \(level A\)](#)

User Impact

Keyboard-only users have to spend extra time and effort to experiment with the custom controls and to find workarounds to access the site navigation links.

Problematic Access to Published AHRI Standards and Guides

The search feature has several implementation problems that affect users of access technologies:

- The state of the "Filter by" disclosure button is not programmatically available.
- The checkboxes in the "Filter By" or "Sort By" categories are not keyboard operable due to the CSS styling of "visibility: hidden" which hides them from access technology.
- The list or grid view buttons also indicate their state only visually, with no programmatic mark-up so that the same information can be communicated to screen reader users.

REV-37

- Some pagination controls have uninformative accessible names, e.g. the current page button is labelled as "undefined", while the next page button is named "[object Object]".

Fails

- [2.1.1 Keyboard \(level A\)](#)
- [2.4.6 Headings and Labels \(level AA\)](#)
- [4.1.2 Name, Role, Value \(level A\)](#)

User Impact

Users with various levels of dexterity who rely on keyboard input cannot reach any of the checkboxes to filter and/sort results. Similarly, blind screen reader users can be prevented or will experience increased difficulty in searching for a specific standard or guide or resource.

Problematic PDF Documents

There are several accessibility issues that relate to the standards PDFs:

- Older documents, e.g. "AHRI_Guideline_B_1997", are completely inaccessible and are presented as scanned images of the printed version.
- In newer documents, e.g. "AHRI 140-2023 (I-P)", content is tagged but in an incorrect way which does not accurately convey the information which is visually available.
- Text alternatives are not provided for images, diagrams, charts, or graphs meaning they are completely inaccessible for blind screen reader users.
- Visual headings are not implemented as semantic headings. It is impossible to rely on headings to determine the document structure or to find content.
- Row and column headers are not marked up as such, meaning that content in data tables is conveyed without reference to the visual headers.
- Mathematical equations do not make sense when reached with a screen reader.
- Some bookmarks are provided, for example "2023 (2020) Standard for Performance Rating of Unitary Air-conditioning & Air-source Heat Pump

REV-38

Equipment" has 141 pages and five bookmarks, mainly for the first pages, which make for an incomplete outline of the main sections in the PDF.

- Some documents, such as "AHRI Standard 210/240 with Addendum 1", contain instructions that strictly rely on the user's ability to see specific styling of text, such as "Addendum deletions are shown with strikethrough and addendum additions are shown by shading in gray.", which are not conveyed to blind screen reader users.
- Some documents lack a title, e.g. "2023 (2020) Standard for Performance Rating of Unitary Air-conditioning & Air-source Heat Pump Equipment".

Fails

- [1.1.1 Non-text Content \(level A\)](#)
- [1.3.1 Info and Relationships \(level A\)](#)
- [1.3.2 Meaningful Sequence \(level A\)](#)
- [1.3.3 Sensory Characteristics \(level A\)](#)
- [2.4.1 Bypass Blocks \(level A\)](#)
- [2.4.2 Page Titled \(level A\)](#)
- [4.1.1 Parsing \(level A\)](#)

User Impact

When a document is reviewed using a screen reader, it can be difficult or impossible to understand some of the information in the PDFs. The lack of semantic mark-up is especially problematic when it comes to finding content in large documents such as "2023 (2020) Standard for Performance Rating of Unitary Air-conditioning & Air-source Heat Pump Equipment" containing 141 pages.

REV-39

AISC Reading Room

URL: <https://www.aisc.org/publications/>

Steps:

1. Go to the ANSI portal at <https://ibr.ansi.org/>.
2. Go to the "Hosted by SDOs" section.
3. Activate the "AISC" logo link to go to the [AISC Publications](#) page.
4. Select to log in.
5. Create an account on the [Registration](#) page.
6. Return to the [AISC Publications](#) page.
7. Open a free publication.

Poor Keyboard Focus Visibility

When users press Tab or Shift+Tab through the header the default outline is removed via "outline: none". The custom focus indicator relies on background color changes that are difficult or impossible to detect for some. Examples include:

- the top bar links have an off-white (#FAFAFA) background which updates to white (#FFFFFF) meaning that the resulting color contrast for the focus indicator is extremely low, at 1.04:1; and
- the main navigation links use a linear gradient background with varied shades of off-white and grey, depending on the hero image content. A sample color in the vicinity of the "Publications" link is #EDEFF0 which has a color contrast ratio of 1.15:1 with the white (#FFFFFF) background color on keyboard focus.

In other instances, there is no focus indicator whatsoever, as noted in the case of the social media links in the footer or the logo link in the header.

Fails

- [1.4.11 Non-text Contrast \(level AA\)](#)
- [2.4.7 Focus Visible \(level AA\)](#)

REV-40

User Impact

Sighted keyboard-only users will have difficulty tracking the focused element and will most likely end up pressing the wrong links leading to unintended actions. Folks that have low vision will simply not be able to see the focus indicator and determine which control has keyboard focus.

Problematic Structural Semantic Mark-Up

The page structure is not rendered accurately in a programmatic way so that information and relationships that are visually evident can be made available for users of access technologies.

- While landmarks are used, not all content is encompassed in the corresponding region, some areas are missing the appropriate mark-up, and navigational regions lack an accessible name.
- Headings are problematic as well, with two level 1 headings on all pages and skipped levels in many instances.

The problematic semantic mark-up also affects the user's ability to skip past repeated blocks of content in the header. Note also that there is no "Skip to main content" link in the <header> to allow keyboard users to easily reach the main content.

Fails

- [1.3.1 Info and Relationships \(level A\)](#)
- [2.4.1 Bypass Blocks \(level A\)](#)

User Impact

Blind screen reader users cannot determine how content is structured on the page and determine useful context within each section that is visually evident. Additionally, without a "Skip to main content" link and the appropriate semantic mark-up for headings and regions, users cannot effectively skip to a specific section. Instead, they must explore the page in a linear manner which is time consuming and frustrating.

REV-41

Inaccessible Header Controls

Several header controls that use an icon as a visible label are missing an accessible name to indicate their purpose for screen reader users.

- The dropdown toggle that reveals the "Login" link is announced for screen reader users as "link" without any name or indication of state that it reveals additional content. Note that the role of the control is incorrect as well since it acts as a button and does not open a new page.
- The "Search" button is announced as "button" without any name.
- The cart link is announced as "link" with the count numeric value of items added in cart if applicable.

Fails

- [1.1.1 Non-text Content \(level A\)](#)
- [4.1.2 Name, Role, Value \(level A\)](#)

User Impact

The mentioned header controls are essential to ensure that the user can successfully access the reading room. Note that the AISC standards are free only for members, so creating an account and logging in is required in order to by-pass the payment. Blind screen reader users cannot determine the purpose of these controls. If a user decides to register first as a member before adding items to cart, they will not be able to find the "Login" link.

Incorrect Keyboard Navigation in Login Form

The input fields in the form use tabindex attributes with positive values which means that they are first encountered on the page when Tab is pressed. This creates a very confusing focus order for keyboard users:

- Elements are no longer reached in an order that is based on the visual layout.

REV-42

- After the "Password" field in the "Login" form focus goes to the top bar links in the header and users must tab again to the main content to reach the "Remember me" checkbox and the "Login" button.
- The issue is aggravated by the lack or low visibility of the focus indicator on most actionable elements.

Fails

[2.4.3 Focus Order \(level A\)](#)

User Impact

Keyboard users, such as those who are sighted and have different levels of dexterity or site visitors who are blind and rely on a screen reader, will encounter form elements in an order that is confusing and illogical. This can prevent them from submitting the form successfully and being able to access the free version of the standards.

Inaccessible Error Handling

When the "Login" or "Registration" form is submitted with missing or invalid data, the page is refreshed and error messages are listed below each field. They are not surfaced in an accessible manner so that screen reader users become aware of their presence. Error messages are not programmatically associated with the corresponding fields meaning that when a field is focused, there is no indication that its input is invalid and an error is present.

Fails

- [1.3.1 Info and Relationships \(level A\)](#)
- [3.3.1 Error Identification \(level A\)](#)
- [4.1.3 Status Messages \(level AA\)](#)

REV-43

User Impact

Users without sight that rely on a screen reader to fill out the forms will find it extremely difficult to correct any errors since they must be manually located for each field.

Inaccessible Membership Application Form

In order to access the AISC reading room, one must either pay for the resource or must become a member by completing and submitting an application form that is presented as a downloadable PDF document.

The "full_fabricator_membership_app" form has several accessibility problems that will prevent users from a successful application:

- Content is not tagged, and various sections are read in a random order that is not meaningful.
- The form itself is not fillable and there are no actual input fields. For example, screen reader users hear the labels read together as "Name/Title Email Mobile Name/Title Email Mobile Name/Title Email Mobile" with no option to type in the user's information.
- The document title is not set.
- Incorrect nesting is flagged for many elements.
- The form is missing any semantic mark-up.

Fails

- [1.3.1 Info and Relationships \(level A\)](#)
- [1.3.2 Meaningful Sequence \(level A\)](#)
- [2.1.1 Keyboard \(level A\)](#)
- [2.4.2 Page Titled \(level A\)](#)
- [4.1.1 Parsing \(level A\)](#)

REV-44

User Impact

Many users who cannot print the form and write their information manually will be prevented from filling out the application form and submitting it. This includes blind screen reader users, those with different levels of dexterity that interact with the form using a keyboard or voice commands, or site visitors that do not have access to a printer or a PDF editor software.

REV-45

SIBR Database

URL: <https://standards.gov/sibr/query/index.cfm?fuseaction=home.main>

Steps:

1. Go to the ANSI portal at <https://ibr.ansi.org/>.
2. Go to the FAQ page.
3. Select the link for the [SIBR Database](#) (in the "How can I access more information about the Standards Incorporated By Reference (SIBR) database hosted by NIST" section).
4. Go to the [Publications page](#) and use the search feature.

Problematic Navigation on NIST Site

Users of access devices encounter several problems as they explore the site, for example:

- When the "Menu" button in the header is activated, the main navigation controls are revealed in a modal-like container, which is completely inaccessible for screen reader users due to an `aria-hidden="true"` applied on a parent container (`<div>` with `class="dialog-off-canvas-main-canvas"`).
- The "Connect with Us" link has a text alternative of "GovDelivery" which does not convey the link purpose to screen reader users. Also, those relying on voice commands will not be able to activate the link using the visible text that precedes the email icon.
- The "Advanced Search" button on the "Publications" page acts as a disclosure control that reveals and hides the related form controls and conveys its state using an `aria-expanded` attribute, which is correct, and an `aria-pressed` attribute, which is intended for toggle buttons. This creates confusing announcements for screen reader users that vary across environments leaving users uncertain of the control's functionality.
- In the "Advanced Search" form:
 - The "NIST Pub Series" is a single-select that is positioned off-screen and removed from the keyboard focus order using a `tabindex="-1"`. A custom control is provided that creates significant accessibility problems. On desktop browsers, there is no focus outline on the single-select when Tab or Shift+Tab

REV-46

is pressed. Screen reader users hear the field as an unlabeled read-only input field which is incorrect.

- The "NIST Topic Areas" multi-select control is announced as an unlabeled text field, and options are announced as "blank" when focused. No programmatic mark-up exists to convey the component as a combobox with an associated listbox and list of selected values.

Fails

- [2.1.1 Keyboard \(level A\)](#)
- [2.4.6 Headings and Labels \(level AA\)](#)
- [2.5.3 Label in Name \(level A\)](#)
- [4.1.2 Name, Role, Value \(level A\)](#)

User Impact

Blind screen reader users are heavily impacted by the inaccessibility of the main menu and will not be able to reach some of the pages or they might find them with great difficulty.

REV-47

APA – The Engineered Wood Association

URL: <https://www.apawood.org/publication-search?q=>

Steps:

1. Go to the ANSI portal at <https://ibr.ansi.org/>.
2. Go to the "Hosted by SDOs" section.
3. Activate the "APA" logo link to go to the [APA Publication Search - APA – The Engineered Wood Association](#) page.
4. Activate the "Sign in" link.
5. Select the "Register" link and create a new account.
6. Open any document that has a "Free Download" link and access its content.

Inaccessible CAPTCHA Test

The "Create A New Account" form contains a required CAPTCHA test, which is based on the users' ability to perceive a set of letters in an image of text which raises serious accessibility barriers:

- The test image has an alt attribute with an empty value, meaning that screen readers will ignore the image completely. People who are blind are completely blocked from registering with APA.
- The image has a granular appearance, with various shades of light grey in each letter, with the darkest one being #999. The background uses white and off-white colors, meaning that the highest color contrast for parts of text with #999 against a #FFF background is 2.85:1 which falls below the required color contrast ratio.
- There is no alternative for the visual test that would be based on a different perception modality.

Fails

- [1.1.1 Non-text Content \(level A\)](#)
- [1.4.3 Contrast \(Minimum\) \(level AA\)](#)

REV-48

User Impact

It is impossible for a blind screen reader user to figure out the letters in the image and pass the test. Such users cannot create an account with APA since the CAPTCHA test is required to submit the form. Without an account, a blind user cannot access any of the downloadable APA documentation. Users with low vision are similarly affected.

Incorrect Keyboard Navigation in Registration Form

The input fields in the "Create A New Account" form each have a `tabindex="10"` applied which means that they are first encountered on the page when Tab is pressed. This creates a very confusing focus order for keyboard users:

- Elements are no longer reached in an order that is based on the visual layout.
- After the last checkbox in the "User Services" group, the keyboard focus moves to the header and users must tab again to the main content to reach the CAPTCHA test and the "Create Account" button.

Fails

[2.4.3 Focus Order \(level A\)](#)

User Impact

Keyboard users such as those who are sighted and have different levels of dexterity or folks who are blind and rely on a screen reader, will encounter form elements in an order that is confusing and illogical. The focus order creates the concern that the submit button and the CAPTCHA test might not be focusable at all. This can prevent them from submitting the form successfully.

Missing Programmatic Labels for Several Form Fields

Several input fields in the "Create A New Account" form lack a programmatic association with their visible label meaning that there is no indication of the input purpose, e.g., "Confirm Email", or the fields rely on their default option, e.g. "Profession", "State/Province", and "Country".

REV-49

Fails

- [1.3.1 Info and Relationships \(level A\)](#)
- [4.1.2 Name, Role, Value \(level A\)](#)

User Impact

When blind screen reader users reach the form fields, they are announced only with their role such as a text field or combobox and the entered value, meaning it is difficult to determine the field purpose. This will increase the chance of encountering errors upon form submission.

Inaccessible On-Hover Content

In several instances, additional content becomes available on mouse hover. Such content cannot be accessed using the keyboard, such as:

- the submenus in the fly-out main navigation;
- the tooltips for various filter options, e.g. "Builder Tips"; and
- additional description text for card-type links, such as those in <div> with class="thumb" on the "Products" page.

Fails

[2.1.1 Keyboard \(level A\)](#)

User Impact

Using a mouse can be very difficult or impossible for some people, meaning that such content available only on hover, is inaccessible for keyboard users or speech input users.

REV-50

Inaccessible Error Handling

The "Create A New Account" form does not indicate visually nor programmatically which fields are required and which are not. Additionally, some error text is displayed without giving the user the chance to enter a value. For example, when the "Country" is selected, there are two error messages: "State/Province is required" and "Zip/Postal Code is required" which is quite confusing since users may think that filling out those two forms is sufficient regarding the address details or even the registration process. But the "City" and other fields are also required.

When the form is submitted with invalid data, error messages are listed inline and at the bottom of the form above the "Create Account" button, however they are not surfaced in an accessible manner so that screen reader users become aware of their presence or updated content when the form is resubmitted. Additionally, error messages are not programmatically associated with the corresponding fields to assist users in correcting the entry.

Fails

- [1.3.1 Info and Relationships \(level A\)](#)
- [3.3.1 Error Identification \(level A\)](#)
- [3.3.2 Labels or Instructions \(level A\)](#)
- [4.1.3 Status Messages \(level AA\)](#)

User Impact

Both sighted and non-sighted users cannot determine what information is mandatory for the registration process and what is optional, and will most likely attempt to submit the form a few times until all errors are cleared. Blind screen reader users must explore the form in a linear manner and manually locate the error messages.

Inaccessible PDF Documents

There are several accessibility issues that relate to the standards PDFs:

REV-51

- Content is not tagged resulting in many nesting problems for semantic content. This means that screen reader users will not hear elements announced within the context that is visually intended.
- The reading order is not meaningful especially where content is displayed on two columns or in a data table as noted in the "Q300.pdf" file. Users cannot make sense of the information announced in the screen reader output.
- The document title and language are not set.
- There are many text frames that make content very difficult to read with a screen reader, for example the many data tables in the "E30.pdf" (Engineered Wood Construction Guide) cannot be accessed at all. From the cover of the document only the "Construction Guide" text can be read with a screen reader.
- All PDFs are secured and some of the settings might affect their readability with access technology. For example, in the "E30.pdf" file, users cannot read in a linear manner from one page to the next and instead must manually select a page thumbnail and then go back to the document pane. This creates the impression that the end of a page is the end of the document which is inaccurate.
- Text alternatives are not provided for images meaning they are completely inaccessible for blind screen reader users.
- No bookmarks are found although documents can be quite large, for example the "Engineered Wood Construction Guide" has 102 pages.

Fails

- [1.1.1 Non-text Content \(level A\)](#)
- [1.3.1 Info and Relationships \(level A\)](#)
- [1.3.2 Meaningful Sequence \(level A\)](#)
- [2.4.1 Bypass Blocks \(level A\)](#)
- [2.4.2 Page Titled \(level A\)](#)
- [3.1.1 Language of Page \(level A\)](#)
- [4.1.1 Parsing \(level A\)](#)

REV-52

User Impact

When a document is reviewed using a screen reader, it is difficult or impossible to understand some of the information in the PDFs. The lack of semantic mark-up is especially problematic when it comes to finding content in large documents.

Additionally, some PDFs cannot be explored in a linear manner most likely due to the presence of text frames and security settings.

REV-53

IEEE, The Institute of Electrical and Electronics Engineers

URL: <https://ieeexplore.ieee.org/browse/standards/reading-room/page>

Steps:

1. Go to the ANSI portal at <https://ibr.ansi.org/>.
2. Go to the "Hosted by SDOs" section.
3. Activate the "IEEE" logo link to open <https://ieeexplore.ieee.org/browse/standards/reading-room/page>.
4. Select any standard documentation.
5. Create an account.
6. Open any read-only document and access its content.
7. On the same [Browse Standards Reading Room](#) page, search for a standard.
8. Open the standard page.

Inaccessible Links and Buttons in the Reading Room

Throughout the flow of accessing a document, there are many controls that cannot be reached at all by keyboard-only users. Examples include:

- All standards links in the Reading Room;
- The buttons that remove an applied filter on the home or search results page;
- The "Create account" link in the "Sign In with your IEEE Account to access this free standard" dialog; and
- The related "Search Term" buttons in the Advanced Search form.

Note that if users search for a standard via the provided search feature, the document can be opened in a preview mode with a link to the same inaccessible "Reading Room" page.

Fails

[2.1.1 Keyboard \(level A\)](#)

REV-54

User Impact

Sighted keyboard-only users cannot reach the standards links when they press Tab or Shift+Tab. This renders the Reading Room completely unusable for folks that rely solely on keyboard input. Such users can see the controls but cannot reach them nor interact with them. Without the use of a mouse, which is an impossibility for some, such folks have to abandon the site defeated.

Change of Context on Input

When keyboard users check the "Open Access Only" radio button on the "IEEE Xplore Search Results" page, results are automatically filtered and keyboard focus becomes lost.

Fails

[3.2.2 On Input \(level A\)](#)

User Impact

Screen reader and keyboard users can no longer determine the focused element and must resume navigation from the top of the page or a random location. This severely interrupts the user's flow and increases the cognitive effort to complete such a simple filtering task.

Problematic Registration Form

In order to access the Reading Room, one must create an account which may not be available for some due to the many impediments encountered in the flow. Some are mentioned below:

- Input fields have a tabindex attribute with a positive value which means that they are first encountered on the page when Tab is pressed as it is noted in the case of the "Create Account" form. This creates a very confusing focus order for keyboard users. In the case of the "Email verification code" field that appears in a modal dialog, the tabindex="1" makes the form unreachable after exiting the field.

REV-55

- A reCAPTCHA test that expires in two minutes must be passed in order to submit the form. Due to the component's accessibility issues and the form's problems overall, such a task will be challenging for users of access technology.
- No feedback is provided when updates occur, such as the presence of a loading animation or the addition of a disclaimer text when the user checks the "I have read and accept the IEEE Privacy Policy" checkbox.
- The tooltips with additional instructions for the password format requirements or the security question are inaccessible for keyboard users. Mouse users cannot dismiss them without having to move the mouse pointer. Also, they can hover over the tooltip text. This affects users with low vision that rely on screen magnification as it limits their ability to scroll and pan the area of the viewport and read the text. When content is presented in a modal dialog, the button that dismisses the overlay lacks an accessible name.
- The confirmation dialog has an aria-hidden="true" applied on its container meaning that screen reader users cannot interact with its content at all.
- Screen reader users can only open the links in the Reading Room if they explore the page in a linear manner ([Inaccessible Links and Buttons in the Reading Room](#)).
- In the "Reading Room" form that collects additional information, form fields are missing a programmatic name together with a persistent label and rely either on the placeholder text or default value, which is not an accessible approach ([Missing Visible and/or Programmatic Labels for Input Fields](#)).
- If users try to log in using the "Personal Sign In" button in the header, aria-hidden="true" is incorrectly applied on a parent container of the expanded form.

Fails

- [1.3.1 Info and Relationships \(level A\)](#)
- [1.4.13 Content on Hover or Focus \(level AA\)](#)
- [2.1.1 Keyboard \(level A\)](#)
- [2.4.3 Focus Order \(level A\)](#)
- [3.3.2 Labels or Instructions \(level A\)](#)
- [4.1.2 Name, Role, Value \(level A\)](#)
- [4.1.3 Status Messages \(level AA\)](#)

REV-56

User Impact

In addition to the complexity of the registration process, users of access technology have to encounter content in an illogical order or some cannot be reached at all. Blind screen reader users cannot determine the control purpose for several elements which makes submitting the many forms successfully extremely difficult, if not impossible.

Inaccessible "IEEE Xplore" Content Viewer

Users that have created an account can open some standards, e.g. "C37.12-2018 - IEEE Guide for Specifications of High-Voltage Circuit Breakers (over 1000 V)" in a read-only content viewer which comes with additional blockers for users of access technology.

- Each page in the document is implemented using a with id="photo" and class="spinner_overlay" and no textual alternative.
- The <title> element is not present and the page URL is conveyed as the document's title.
- The navigation controls are missing an accessible name to convey their purpose to screen reader users. Additionally, they are displayed with insufficient color contrast.
- Many elements are nested against the HTML specifications and multiple instances of duplicate ID values are found.
- The "Feedback" button cannot be activated using the keyboard with or without a screen reader.

Fails

- [1.1.1 Non-text Content \(level A\)](#)
- [1.4.5 Images of Text \(level AA\)](#)
- [2.1.1 Keyboard \(level A\)](#)
- [2.4.2 Page Titled \(level A\)](#)
- [4.1.1 Parsing \(level A\)](#)

REV-57

- [4.1.2 Name, Role, Value \(level A\)](#)

User Impact

Blind screen reader users cannot access any of the document content. None of the text that is seen in the viewer is spoken by the screen reader.

REV-58

Underwriters Laboratories

URL: <https://www.ulstandards.com/IBR/logon.aspx>

Steps:

1. Go to the ANSI portal at <https://ibr.ansi.org/>.
2. Go to the "Hosted by SDOs" section.
3. Activate the "Underwriters Laboratories" logo link to open <https://www.ulstandards.com/IBR/logon.aspx>.
4. Create an account.
5. Open any read-only document and access its content.

Problematic Registration Process

Site visitors are required to log in when they attempt to reach the reading room. There are several accessibility problems that will make the registration attempt difficult:

- Pages contain many layout tables that are not marked as such and create an overly verbose speech output for screen reader users when the table semantics are conveyed for each element.
- Links rely on color alone to indicate that their text is actionable.
- Error messages are not provided in text for the "Log in" form.
- In the "Register", "Forgot Password", and "Reset Password" forms, fields are unlabeled to indicate their purpose in a programmatic manner.
- When forms are submitted with invalid data, an error summary is displayed at the top of the page:
 - errors are displayed with insufficient color contrast;
 - the focus remains on the submit button at the bottom of the form;
 - no feedback is provided for screen reader users that cannot determine the outcome of the submission;
 - an asterisk is added after each field that has an error message listed in the summary, but its meaning is unclear; and
 - there are no inline errors provided nor is there any association between a field and the error message in the summary.

REV-59

- Additional problems are encountered in the "Register" form:
 - It also relies on color cues to convey information. The instructions text "Required information is red" is displayed at the top of the form and field labels of required fields use red (#FF0000) font color while optional fields use black (#000000) text. In addition to the fact that the red (#FF0000) color has insufficient color contrast with the white background, it can be difficult or impossible to distinguish by people with color blindness, low vision, or neurodiverse users who require some form of font customization.
 - There is no programmatic mark-up to convey which fields are required either, meaning that blind screen reader users cannot determine what information must be provided to submit the form.

Fails

- [1.3.1 Info and Relationships \(level A\)](#)
- [1.4.1 Use of Color \(level A\)](#)
- [1.4.3 Contrast \(Minimum\) \(level AA\)](#)
- [3.3.1 Error Identification \(level A\)](#)
- [3.3.2 Labels or Instructions \(level A\)](#)
- [4.1.3 Status Messages \(level AA\)](#)

User Impact

Users with color blindness, low vision, or no vision at all will find it difficult or impossible to submit the registration form successfully.

Incorrect Reflow Behavior for Forms

With a viewport size of 320 × 256px, the forms do not reflow correctly. Input fields and related form controls are partially obscured and require horizontal scrolling while other elements become overlapped and unreadable.

REV-60

Fails

[1.4.10 Reflow \(level AA\)](#)

User Impact

For people with low vision, enlarged text with reflow enables reading. Enlargement enables perception of characters, while reflow enables tracking or following along lines of text, including getting from the end of one line to the beginning of the next line. The need of scrolling in both directions significantly increases the effort required to read for screen magnification users.

Problematic Dashboard Page

Once users are logged in, the home page contains a data table with all documentation with links to standards in an HTML or PDF format.

- Input fields are again unlabeled, and their purpose is unclear.
- Visual headings are not marked up semantically as such.
- Some columns are sortable, but this is not conveyed to screen reader users.
- The data table contains many links with non-unique accessible names, e.g. "View HTML" or "View PDF".
- When a link to a standard is activated, focus is not sent to the "Terms and Conditions" dialog. Keyboard users must tab through the entire page content, which is now dimmed, to reach the dialog.

Fails

- [1.3.1 Info and Relationships \(level A\)](#)
- [2.4.3 Focus Order \(level A\)](#)
- [4.1.2 Name, Role, Value \(level A\)](#)

REV-61

User Impact

Blind users are most impacted by the existing problems, partly because the process of searching for a standard is difficult due to unlabeled input fields and the table implementation, but mostly because users encounter complete silence when activating a link and the "Terms and Conditions" dialog appears. Users may think that the link is broken and it is unlikely that they will manually explore the entire page content in order to find the dialog at the end of the page to agree with the terms and continue.

Inaccessible PDF Documents

Documents can only be reviewed online and contain scanned versions of the standards. They are practically images of text and are not accessible to many user groups.

Fails

- [1.1.1 Non-text Content \(level A\)](#)
- [1.4.5 Images of Text \(level AA\)](#)
- [1.3.1 Info and Relationships \(level A\)](#)
- [2.4.3 Focus Order \(level A\)](#)
- [4.1.2 Name, Role, Value \(level A\)](#)

User Impact

Screen reader users may hear random letters in words but no meaningful text is read from the scanned documents, for example, NVDA users repeatedly hear "graphic Unlabeled graphic Unlabeled" with each press of the Down Arrow key to read through the PDF.

Problematic Documents in HTML Format

The text in HTML documents is readily accessible for screen reader users and this is by far preferred over the PDF format. However, documents exhibit several accessibility problems:

REV-62

- Users are not allowed to press the Control key which interferes with standard keyboard and screen reader interaction, e.g. read by paragraphs. If the key is used in a common shortcut, an alert dialog disrupts users and moves the keyboard focus from the document to the alert.
- Visual headings are marked up as headings, but levels are not always accurate to reflect the document structure.
- The folder controls in the table of contents are missing an accessible name and incorrectly move focus to the corresponding section when in fact they are only intended to expand or collapse a tree node.
- In-page links are keyboard operable but send focus to a blank element preceding the targeted section.
- Input fields are unlabeled as noted throughout the site for form controls.
- Text elements related to the document metadata have insufficient color contrast.

Fails

- [1.1.1 Non-text Content \(level A\)](#)
- [1.3.1 Info and Relationships \(level A\)](#)
- [1.4.3 Contrast \(Minimum\) \(level AA\)](#)
- [2.4.3 Focus Order \(level A\)](#)
- [3.2.1 On Focus \(level A\)](#)
- [4.1.2 Name, Role, Value \(level A\)](#)

User Impact

Users of access technology can access the document content but will explore its content with difficulty due to the problematic restrictions and incorrect implementation of the table of contents. This means that additional time and effort is required from various user groups to simply read and explore the document.

REV-63

ICC, The International Code Council

URL: <https://codes.iccsafe.org/>

Steps:

1. Go to the ANSI portal at <https://ibr.ansi.org/>.
2. Go to the "Hosted by SDOs" section.
3. Activate the "ICC, International Code Council" logo link to open <https://codes.iccsafe.org/>.
4. Search for a document or browse by "Standards".
5. Open any read-only document and access its content.

Restricted Zoom by Viewport Scaling

The currently set viewport values prevent users from resizing the pages (<meta name="viewport" content="width=device-width, initial-scale=1, minimum-scale=1, user-scalable=no">).

Fails

[1.4.4 Resize text \(level AA\)](#)

User Impact

While some browsers might override such settings, others will not and viewers with low vision that require screen magnification will not be able to adjust the zoom to fit their needs so they can read the text.

Inaccessible Main Menu

The site navigation is displayed in the context of a modal dialog once users activate the "Menu" button. There are several accessibility problems relating to its implementation:

- Keyboard focus is not managed to go to the menu overlay when displayed and return to the "Menu" button when dismissed.

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- With the menu in view, keyboard focus escapes to the page elements in the dimmed background. The required mark-up to convey the menu as a modal dialog to users of access technology is not present.
- Similarly, focus is not managed when a submenu is opened, e.g. "Standards" or when users return to the main menu.
- The links in submenus are not keyboard operable. For example, in the "Standards" submenu, only "Browse All Standards" can be reached when pressing Tab or Shift+Tab, while the actual links to various standards cannot be focused.
- The structure of the main menu is not programmatically available so that it can be communicated to blind screen reader users.

Fails

- [1.3.1 Info and Relationships \(level A\)](#)
- [2.1.1 Keyboard \(level A\)](#)
- [2.4.3 Focus Order \(level A\)](#)
- [4.1.2 Name, Role, Value \(level A\)](#)

User Impact

Sighted and non-sighted keyboard users are most severely affected by the missing focus management because elements are reached in an illogical order. Currently, users must navigate backwards from the "Menu" button to get to the overlay, meaning that some users will simply assume that the "Menu" button is not functional.

The incorrect implementation of the many links in the submenus prevents keyboard-only users from interacting with the links and while screen reader users may reach them, no interactive role is communicated to indicate that they function as links.

Inaccessible Menu Widgets

On the "Digital Codes" landing page, in the "Browse Available Contents By:" section, there are eight category buttons that expand a collection of "menuitems". Each <button> element contains a down pointing arrow to visually indicate the disclosure

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functionality. There is no programmatic means to convey the same information for blind screen reader users.

Additionally, once a button is activated, e.g. "Standards", a popup is displayed with related options, each implemented as a link with a "menuitem" role, while the group is encompassed in a <div> with role="menu". Since the implementation is incomplete and there is no programmatic association between the triggering control and the popup, screen reader users cannot interact with the menu items. If Down Arrow is pressed, the keyboard focus does move through the items, but the speech output is silent. If Tab is pressed the popup is dismissed and focus moves to the next control on the page.

Fails

- [1.3.1 Info and Relationships \(level A\)](#)
- [2.1.1 Keyboard \(level A\)](#)
- [4.1.2 Name, Role, Value \(level A\)](#)

User Impact

Screen reader users will feel confused about the functionality of the buttons in the "Browse Available Contents By:" section and will most likely conclude that they are broken.

Inaccessible "Popular Contents" Cards

All links in the "Popular Contents" carousel have aria-hidden="true" applied on all cards with popular standards which completely blocks access to the cards from many users. The attribute is only removed once the carousel is manually rotated.

This issue adds to the problematic mechanism of finding a specific standard with significant blockers in all features, as detailed in related observations.

Fails

- [1.3.1 Info and Relationships \(level A\)](#)

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- [2.1.1 Keyboard \(level A\)](#)
- [4.1.2 Name, Role, Value \(level A\)](#)

User Impact

Screen reader users can tab through the cards, but the card content is not communicated and thus cannot determine what content they represent. Blind users cannot determine the purpose of the component. Speech input users cannot activate the links in the carousel without manually rotating it.

Missing Text Alternative for Images

Throughout the site, buttons and links that use an icon or an image for a visual label, have no text alternative. This means that screen reader users will hear the controls announced without any name or with part of the image file name. Some examples are:

- many controls in the header, such as the logo link, "Recent Updates", "ICC Family Solution" buttons, and several controls in the main menu overlay;
- the "Menu" button in the mobile header;
- some carousel navigation buttons on the homepage;
- the "Browse by Category" button;
- the "Add to Favorites" button;
- the button that shows or hides the "Table of Contents" panel; and
- the disclosure controls in the "Table of Contents" panel.

Similarly, images that are part of card components are also missing a text alternative and are each conveyed as "unlabeled graphic" for screen reader users.

Fails

- [1.1.1 Non-text Content \(level A\)](#)
- [4.1.2 Name, Role, Value \(level A\)](#)

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User Impact

There are no workarounds available for blind screen reader users to figure out what the images represent. In cases where they are actionable, users cannot determine what is their functionality. Since there is a significant number of occurrences, many users might just abandon the site after several unintended interactions.

Problematic Content Viewer

Some standards that are part of the free "Basic" plan, can be reviewed within the site, which is a very useful approach, however there are several accessibility issues noted:

- The names of all chapters, parts, sections, and further subsections that are visually styled as headings are each marked up as a level 1 heading which should have been reserved for the standard documentation title. An example standard is "2022 Denver Green Code".
- Data in tables is announced using a screen reader without referencing its visual column header, e.g. "2021 International Private Sewage Disposal Code (IPSDC)".
- The "Legend" control opens a modal dialog, but the triggered overlay is missing the required mark-up and focus management to convey the context of a modal dialog for screen reader users.
- The document uses changes in font color to convey information, e.g. "Technical code changes from the previous edition of the International Codes are shown in blue text", "National (outside U.S.) and state amendments and errata to International Codes are shown in red text", and "City or local amendments and errata to the International Codes are shown in fuchsia text". This is noted in the legend of documents, e.g. "2021 International Plumbing Code (IPC) ".
- Some documents, e.g. "2021 International Building Code (IBC): Chapter 11 Accessibility", contain tooltips which are inaccessible without the use of a mouse. For example, the tag buttons that open a dialog, such as "P" (Premium Code Insights), "Key Changes", or "Study Topics". The tooltip content is not hoverable.

Fails

- [1.3.1 Info and Relationships \(level A\)](#)
- [1.3.3 Sensory Characteristics \(level A\)](#)

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- [1.4.3 Contrast \(Minimum\) \(level AA\)](#)
- [1.4.13 Content on Hover or Focus \(level AA\)](#)
- [2.1.1 Keyboard \(level A\)](#)
- [2.4.3 Focus Order \(level A\)](#)
- [4.1.2 Name, Role, Value \(level A\)](#)

User Impact

Whenever the heading levels are incorrect, it is impossible for screen reader users to accurately determine the document structure.

The information that is conveyed using styling techniques is not made available for screen reader users that are blind. Users with low vision will have difficulty reading redacted text when displayed with insufficient color contrast, while color blind users may not identify the font color formatting.

Additionally, the problematic tooltips are inaccessible for sighted keyboard-only users. Screen magnification users cannot read the tooltip text since it cannot be hovered, and it disappears as soon as the mouse pointer is moved away from the triggering control.

Inaccessible Controls in "Table of Contents"

Some standards that are part of the free "Basic" plan can be reviewed within the site, however, the "Table of Contents" panel intended for navigation to different chapters, parts, sections, and further subsections has several serious problems that can limit a user's access to different areas of the document:

- The "Table of Contents" lacks any structural mark-up to convey relationships between items that are visually evident.
- Each expandable item contains an icon implemented as a <button> element. Since it has no text alternative, screen readers announce all these controls as unlabeled, with no indication of their purpose ([Missing Text Alternative for Images](#)). The state as expanded or collapsed is also not communicated.
- The name of each item in the "Table of Contents" serves as a link to load that part of the standard. None can be reached by keyboard-only users.

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- A context menu is available for each custom link, but only on mouse right-click.
- When the control that collapses the panel is activated, keyboard users must still tab through all hidden "Table of Contents" buttons.

Fails

- [1.1.1 Non-text Content \(level A\)](#)
- [1.3.1 Info and Relationships \(level A\)](#)
- [1.3.2 Meaningful Sequence \(level A\)](#)
- [2.1.1 Keyboard \(level A\)](#)
- [2.4.3 Focus Order \(level A\)](#)
- [4.1.2 Name, Role, Value \(level A\)](#)

User Impact

The "Table of Contents" links are fully inaccessible for keyboard-only users and all that is available is expanding or collapsing the nodes in the navigational structure, but users cannot access anything further than the introductory page. Due to the many issues that relate to the mark-up of the "Table of Contents" panel, screen reader users cannot determine the structure of the document and find intended content.

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Appendix: Failed Success Criteria

1.1.1 Non-text Content (level A)

All non-text content that is presented to the user has a text alternative that serves the equivalent purpose, except for the situations listed below.

- Controls, Input: If non-text content is a control or accepts user input, then it has a name that describes its purpose. (Refer to Success Criterion 4.1.2 for additional requirements for controls and content that accepts user input.)
- Time-Based Media: If non-text content is time-based media, then text alternatives at least provide descriptive identification of the non-text content. (Refer to Guideline 1.2 for additional requirements for media.)
- Test: If non-text content is a test or exercise that would be invalid if presented in text, then text alternatives at least provide descriptive identification of the non-text content.
- Sensory: If non-text content is primarily intended to create a specific sensory experience, then text alternatives at least provide descriptive identification of the non-text content.
- CAPTCHA: If the purpose of non-text content is to confirm that content is being accessed by a person rather than a computer, then text alternatives that identify and describe the purpose of the non-text content are provided, and alternative forms of CAPTCHA using output modes for different types of sensory perception are provided to accommodate different disabilities.
- Decoration, Formatting, Invisible: If non-text content is pure decoration, is used only for visual formatting, or is not presented to users, then it is implemented in a way that it can be ignored by access technology.

[Understanding 1.1.1](#)

1.3.1 Info and Relationships (level A)

Information, structure, and relationships conveyed through presentation can be programmatically determined or are available in text.

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[Understanding 1.3.1](#)

1.3.2 Meaningful Sequence (level A)

When the sequence in which content is presented affects its meaning, a correct reading sequence can be programmatically determined.

[Understanding 1.3.2](#)

1.3.3 Sensory Characteristics (level A)

Instructions provided for understanding and operating content do not rely solely on sensory characteristics of components such as shape, color, size, visual location, orientation, or sound.

Note: For requirements related to color, refer to Guideline 1.4.

[Understanding 1.3.3](#)

1.3.5 Identify Input Purpose (level AA)

The purpose of each input field collecting information about the user can be programmatically determined when:

- the input field serves a purpose identified in the Input Purposes for User Interface Components section; and
- the content is implemented using technologies with support for identifying the expected meaning for form input data.

[Understanding 1.3.5](#)

1.4.1 Use of Color (level A)

Color is not used as the only visual means of conveying information, indicating an action, prompting a response, or distinguishing a visual element.

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Note 1: This success criterion addresses color perception specifically. Other forms of perception are covered in Guideline 1.3 including programmatic access to color and other visual presentation coding.

[Understanding 1.4.1](#)

1.4.3 Contrast (Minimum) (level AA)

The visual presentation of text and images of text has a contrast ratio of at least 4.5:1, except for the following:

- Large Text: Large-scale text and images of large-scale text have a contrast ratio of at least 3:1;
- Incidental: Text or images of text that are part of an inactive user interface component, that are pure decoration, that are not visible to anyone, or that are part of a picture that contains significant other visual content, have no contrast requirement.
- Logotypes: Text that is part of a logo or brand name has no contrast requirement.

[Understanding 1.4.3](#)

1.4.4 Resize text (level AA)

Except for captions and images of text, text can be resized without access technology up to 200 percent without loss of content or functionality.

[Understanding 1.4.4](#)

1.4.5 Images of Text (level AA)

If the technologies being used can achieve the visual presentation, text is used to convey information rather than images of text except for the following:

- Customizable: The image of text can be visually customized to the user's requirements;

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- Essential: A particular presentation of text is essential to the information being conveyed.

Note: Logotypes (text that is part of a logo or brand name) are considered essential.

[Understanding 1.4.5](#)

1.4.10 Reflow (level AA)

Content can be presented without loss of information or functionality, and without requiring scrolling in two dimensions for:

- vertical scrolling content at a width equivalent to 320 CSS pixels; and
- horizontal scrolling content at a height equivalent to 256 CSS pixels.

Except for parts of the content which require two-dimensional layout for usage or meaning.

- Note 1: 320 CSS pixels is equivalent to a starting viewport width of 1280 CSS pixels wide at 400% zoom. For web content which is designed to scroll horizontally (e.g., with vertical text), 256 CSS pixels is equivalent to a starting viewport height of 1024 CSS pixels at 400% zoom.
- Note 2: Examples of content which requires two-dimensional layout are images required for understanding (such as maps and diagrams), video, games, presentations, data tables (not individual cells), and interfaces where it is necessary to keep toolbars in view while manipulating content. It is acceptable to provide two-dimensional scrolling for such parts of the content.

[Understanding 1.4.10](#)

1.4.11 Non-text Contrast (level AA)

The visual presentation of the following has a contrast ratio of at least 3:1 against adjacent color(s):

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- User Interface Components: Visual information required to identify user interface components and states, except for inactive components or where the appearance of the component is determined by the user agent and not modified by the author;
- Graphical Objects: Parts of graphics required to understand the content, except when a particular presentation of graphics is essential to the information being conveyed.

[Understanding 1.4.11](#)

1.4.13 Content on Hover or Focus (level AA)

Where receiving and then removing pointer hover or keyboard focus triggers additional content to become visible and then hidden, the following are true:

- Dismissible: A mechanism is available to dismiss the additional content without moving pointer hover or keyboard focus, unless the additional content communicates an input error or does not obscure or replace other content;
- Hoverable: If pointer hover can trigger the additional content, then the pointer can be moved over the additional content without the additional content disappearing;
- Persistent: The additional content remains visible until the hover or focus trigger is removed, the user dismisses it, or its information is no longer valid.

Exception: The visual presentation of the additional content is controlled by the user agent and is not modified by the author.

- Note 1: Examples of additional content controlled by the user agent include browser tooltips created through use of the HTML title attribute.
- Note 2: Custom tooltips, sub-menus, and other nonmodal popups that display on hover and focus are examples of additional content covered by this criterion.

[Understanding 1.4.13](#)

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2.1.1 Keyboard (level A)

All functionality of the content is operable through a keyboard interface without requiring specific timings for individual keystrokes, except where the underlying function requires input that depends on the path of the user's movement and not just the endpoints.

- Note 1: This exception relates to the underlying function, not the input technique. For example, if using handwriting to enter text, the input technique (handwriting) requires path-dependent input, but the underlying function (text input) does not.
- Note 2: This does not forbid and should not discourage providing mouse input or other input methods in addition to keyboard operation.

[Understanding 2.1.1](#)

2.1.2 No Keyboard Trap (level A)

If keyboard focus can be moved to a component of the page using a keyboard interface, then focus can be moved away from that component using only a keyboard interface, and, if it requires more than unmodified arrow or tab keys or other standard exit methods, the user is advised of the method for moving focus away.

Note: Since any content that does not meet this success criterion can interfere with a user's ability to use the whole page, all content on the Web page (whether it is used to meet other success criteria or not) must meet this success criterion. See Conformance Requirement 5: Non-Interference.

[Understanding 2.1.2](#)

2.2.2 Pause, Stop, Hide (level A)

For moving, blinking, scrolling, or auto-updating information, all of the following are true:

- Moving, blinking, scrolling: For any moving, blinking or scrolling information that (1) starts automatically, (2) lasts more than five seconds, and (3) is presented in

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parallel with other content, there is a mechanism for the user to pause, stop, or hide it unless the movement, blinking, or scrolling is part of an activity where it is essential; and

- Auto-updating: For any auto-updating information that (1) starts automatically and (2) is presented in parallel with other content, there is a mechanism for the user to pause, stop, or hide it or to control the frequency of the update unless the auto-updating is part of an activity where it is essential.
- Note 1: For requirements related to flickering or flashing content, refer to Guideline 2.3.
- Note 2: Since any content that does not meet this success criterion can interfere with a user's ability to use the whole page, all content on the Web page (whether it is used to meet other success criteria or not) must meet this success criterion. See Conformance Requirement 5: Non-Interference.
- Note 3: Content that is updated periodically by software or that is streamed to the user agent is not required to preserve or present information that is generated or received between the initiation of the pause and resuming presentation, as this may not be technically possible, and in many situations could be misleading to do so.
- Note 4: An animation that occurs as part of a preload phase or similar situation can be considered essential if interaction cannot occur during that phase for all users and if not indicating progress could confuse users or cause them to think that content was frozen or broken.

[Understanding 2.2.2](#)

2.4.1 Bypass Blocks (level A)

A mechanism is available to bypass blocks of content that are repeated on multiple Web pages.

[Understanding 2.4.1](#)

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2.4.2 Page Titled (level A)

Web pages have titles that describe topic or purpose.

[Understanding 2.4.2](#)

2.4.3 Focus Order (level A)

If a Web page can be navigated sequentially and the navigation sequences affect meaning or operation, focusable components receive focus in an order that preserves meaning and operability.

[Understanding 2.4.3](#)

2.4.4 Link Purpose (In Context) (level A)

The purpose of each link can be determined from the link text alone or from the link text together with its programmatically determined link context, except where the purpose of the link would be ambiguous to users in general.

[Understanding 2.4.4](#)

2.4.6 Headings and Labels (level AA)

Headings and labels describe topic or purpose.

[Understanding 2.4.6](#)

2.4.7 Focus Visible (level AA)

Any keyboard operable user interface has a mode of operation where the keyboard focus indicator is visible.

[Understanding 2.4.7](#)

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2.5.3 Label in Name (level A)

For user interface components with labels that include text or images of text, the name contains the text that is presented visually.

Note: A best practice is to have the text of the label at the start of the name.

[Understanding 2.5.3](#)

3.1.1 Language of Page (level A)

The default human language of each Web page can be programmatically determined.

[Understanding 3.1.1](#)

3.1.2 Language of Parts (level AA)

The human language of each passage or phrase in the content can be programmatically determined except for proper names, technical terms, words of indeterminate language, and words or phrases that have become part of the vernacular of the immediately surrounding text.

[Understanding 3.1.2](#)

3.2.1 On Focus (level A)

When any user interface component receives focus, it does not initiate a change of context.

[Understanding 3.2.1](#)

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3.2.2 On Input (level A)

Changing the setting of any user interface component does not automatically cause a change of context unless the user has been advised of the behavior before using the component.

[Understanding 3.2.2](#)

3.3.1 Error Identification (level A)

If an input error is automatically detected, the item that is in error is identified and the error is described to the user in text.

[Understanding 3.3.1](#)

3.3.2 Labels or Instructions (level A)

Labels or instructions are provided when content requires user input.

[Understanding 3.3.2](#)

4.1.1 Parsing (level A)

In content implemented using markup languages, elements have complete start and end tags, elements are nested according to their specifications, elements do not contain duplicate attributes, and any IDs are unique, except where the specifications allow these features.

- Note 1: This Success Criterion should be considered as always satisfied for any content using HTML or XML.
- Note 2: Since this criterion was written, the HTML Living Standard has adopted specific requirements governing how user agents must handle incomplete tags, incorrect element nesting, duplicate attributes, and non-unique IDs.
- Note 3: Although the HTML Standard treats some of these cases as non-conforming for authors, it is considered to "allow these features" for the purposes

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of this Success Criterion because the specification requires that user agents support handling these cases consistently. In practice, this criterion no longer provides any benefit to people with disabilities in itself.

- Note 4: Issues such as missing roles due to inappropriately nested elements or incorrect states or names due to a duplicate ID are covered by different Success Criteria and should be reported under those criteria rather than as issues with 4.1.1.

[Understanding 4.1.1](#)

4.1.2 Name, Role, Value (level A)

For all user interface components (including but not limited to: form elements, links and components generated by scripts), the name and role can be programmatically determined; states, properties, and values that can be set by the user can be programmatically set; and notification of changes to these items is available to user agents, including access technologies.

Note: This success criterion is primarily for Web authors who develop or script their own user interface components. For example, standard HTML controls already meet this success criterion when used according to specification.

[Understanding 4.1.2](#)

4.1.3 Status Messages (level AA)

In content implemented using markup languages, status messages can be programmatically determined through role or properties such that they can be presented to the user by access technologies without receiving focus.

[Understanding 4.1.3](#)

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